

[Ungrounded DC and AC System Fault Detection and Location System]

Abstract

Systems and methods for locating any grounded circuit on an ungrounded AC or DC system without de-energizing the circuit, and enabling isolation of the grounded component of the circuit. A new ground detection device is combined with location circuitry to provide an "all encompassing" system. The new ground detection/location device can be permanently mounted or used as a portable device to perform both detection and location. A ground current oscillation circuit is provided that will oscillate the ground current and the circuit that contains the fault and thus the oscillating ground current can be located by either a hand held detector or a ground fault module. If the oscillating ground current is not of a sufficient magnitude to detect with the hand held detector or module, then a common mode voltage can be impressed across the ground resistance to increase the ground current. An offset voltage meter will indicate what percentage of the field device has faulted to ground. Offset voltage test lead jacks are provided that will allow a chart recorder to be connected to monitor for ground

faults. A ground current meter is also provided that will allow ground current measurements to be taken that will aid in determining the strength of the ground fault. The permanent ground fault detector/locator has a unique contact configuration that will allow momentary closure during soft ground faults with a re-strike capability to remind an industrial plant operator that a ground fault is still present. Continuous contact closure is also provided for hard ground faults. The permanent ground fault detector/locator also can monitor under voltage and over voltage conditions. The portable ground fault detector/locator has a built in module that allows it to be inserted into a circuit at a junction point to feed the load. A ground fault current oscillation signal is then initiated from the portable ground fault detector/locator that will identify the circuit as grounded if it contains the ground fault. An isolation device can also be used to feed the suspected faulted circuit through the portable ground fault detector/locator and the load isolated from its normal source. Wireless hand held detectors are also provided that can be used to locate the ground fault current oscillations. Multiple hand held detectors can be utilized throughout the circuitry of the ungrounded system during troubleshooting tasks or in anticipation of a ground fault. The wireless hand held detectors can be used for both the permanent or portable ground fault detector/locators.